

UTILITY
PATENT APPLICATION
TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

35.C14512

First Named Inventor or Application Identifier

KOHEI NAKATA

Express Mail Label No.

Commissioner for Patents
Box Patent Application
Washington, DC 20231

APPLICATION ELEMENTS

ADDRESS TO:

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)
2. ☐ Applicant claims small entity status.
See 37 CFR 1.27.
3. ☒ Specification *Total Pages* **21**
4. ☒ Drawing(s) (35 USC 113) *Total Sheets* **10**
5. ☒ Oath or Declaration *Total Pages* **1**
- a. ☒ Newly executed (original or copy)
- b. ☐ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 17 completed)
[Note Box 6 below]
- i. ☐ DELETION OF INVENTOR(S)
Signed Statement attached deleting
inventor(s) named in the prior application, see
37 CFR 1.63(d)(2) and 1.33(b).
6. ☒ Application Data Sheet See 37 CFR 1.76

7. ☐ CD-ROM or CD-R in duplicate, large table or Computer
Program (*Appendix*)
8. ☐ Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
- a. ☐ Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
- i. ☐ CD-ROM or CD-R (2 copies); or
- ii. ☐ paper
- c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☒ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure ☐ Copies of IDS
Statement (IDS)/PTO-1449 Citations
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Other _____

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. ____/_____
Prior application information: Examiner _____ Group/Art Unit: _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

18. CORRESPONDENCE ADDRESS

☒ Customer Number or Bar Code Label **05514**
(Insert Customer No. or Attach bar code label here) or ☐ Correspondence address below

NAME				
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CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	TOTAL CLAIMS (37 CFR 1.16(c))	20-20 =	0	X \$ 18.00 =	\$ 0.00
	INDEPENDENT CLAIMS (37 CFR 1.16(b))	2-3 =	0	X \$ 80.00 =	\$ 0.00
	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.16(d))			\$270 00 =	\$ 270.00
				BASIC FEE (37 CFR 1.16(a))	\$ 710.00
			Total of above Calculations = \$ 980.00		
	Reduction by 50% for filing by small entity (Note 37 CFR 1.9, 1.27, 1.28).				
	TOTAL =				\$ 980.00

19. Small entity status

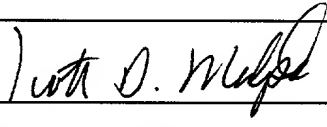
- a. ☐ A small entity statement is enclosed
- b. ☐ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.
- c. ☐ Is no longer claimed.

20. ☒ A check in the amount of \$ 980.00 to cover the filing fee is enclosed.

21. ☒ A check in the amount of \$ 40.00 to cover the recordal fee is enclosed.

22. The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. 06-1205:

- a. ☒ Fees required under 37 CFR 1.16.
- b. ☐ Fees required under 37 CFR 1.17.
- c. ☐ Fees required under 37 CFR 1.18.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED	
NAME	Scott D. Malpede - Reg. No. 32,533
SIGNATURE	
DATE	November 3, 2000

SDM\cmv

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Correspondence Customer Number: 05514

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APPLICATION INFORMATION

Title Line One: METHOD OF PRODUCING FLAT PANEL DISPLAYS

Total Drawing Sheets: 10

Formal Drawings?: Yes

Application Type: Utility

Docket Number: 35.C14512

Secrecy Order in Parent Appl.?: No

REPRESENTATIVE INFORMATION

Representative Customer Number: 5514

PRIOR FOREIGN APPLICATIONS

Foreign Application One: 11-063859

Filing Date: 03-10-1999

Country: JAPAN

Priority Claimed: Yes

Foreign Application Two: PCT/JP00/01436

Filing Date: 03-09-2000

Country: PCT

Priority Claimed: Yes

CFO 14512 US

SPECIFICATION

METHOD OF PRODUCING FLAT PANEL DISPLAYS

5

TECHNICAL FIELD

The present invention relates to a method for producing a flat type image forming apparatus (hereinafter referred to as a flat panel display).

10

BACKGROUND ART

The prior art will be described below by referring to Figures 13 through 22.

15

Figure 22 is a sectional view of a flat panel display 200. The flat panel display 200 is formed by a face plate 201, a rear plate 202, and a frame 203 connecting the face plate 201 to the rear plate 202. Since the flat panel display is vacuum inside, it includes an atmospheric-pressure-resistant support member 204 to stand the atmospheric pressure.

20

The face plate 201 includes a face plate substrate glass 205, a black stripe 206 which is a stopping member formed on the substrate glass 205, an RGB fluorescent object 207, and a metal back 208 for applying a voltage. The rear plate 202 includes a rear plate substrate glass 209, an electronic source generation portion (not shown in Figure 22) formed on

25

the substrate glass 209, and a driving XY matrix wiring (not shown in Figure 22). The atmospheric-pressure-resistant support member 204 is provided between the black stripe 206 of the face plate 201 and an upper wiring 210 of the driving XY matrix wiring of the rear plate 202, and is fixed while maintaining predetermined conductivity by conductive adhesive members 211 and 212.

Described below will be the procedure of assembling a flat panel display.

Figure 13 is a sectional view of the face plate 201. The face plate 201 is provided with an aperture 213 by removing a metal back of the portion to which the atmospheric-pressure-resistive support member is adhered using means such as a laser process, etc. to improve the adhesion as shown in Figure 14.

Then, a conductive adhesive 214 is applied to an aperture 213 (Figure 15).

An assembly jig 216 having a positioning member 215 to which the atmospheric-pressure-resistant support member 204 is applied is used so that the atmospheric-pressure-resistant support member of the face plate 201 can be aligned on the position of the adhesion. The atmospheric-pressure-resistant support member 204 is fixed at a predetermined position of the face plate 201 with the conductive adhesive 214 (Figure 16).

In this step, a face plate member 217 with the

atmospheric-pressure-resistant support member 204 fixed at the predetermined position can be obtained (Figure 17).

5 Then, a conductive flit glass 218 and a frame adhering insulating flit glass 219 are applied on the upper wiring 210 of the driving XY matrix wiring on the rear plate substrate glass 209, and are dried and provisionally sintered (Figures 18 and 19).

10 The face plate member 217 to which the atmospheric-pressure-resistant support member 204 is fixed at a predetermined position; the frame 203 to which the insulating flit glass 218 is applied on the face plate side, dried, and provisionally sintered; and the rear plate substrate glass 209 to which the
15 conductive flit glass 218 and the frame adhering insulating flit glass 219 are applied on the upper wiring 210 of the driving XY matrix wiring, dried, and provisionally sintered are mounted at predetermined positions (Figures 20 and 21). All these members are
20 heated by an electric furnace or a plate heater, and a flit glass is softened and pressed, thereby obtaining the flat panel display 200 (Figure 22).

The present invention aims at realizing a method for producing a preferred flat panel display.

25

DISCLOSURE OF THE INVENTION

An aspect of the present invention relating to a

method for producing a flat panel display is configured as follows.

That is, the method for producing a flat panel display include a face plate portion and a rear plate portion opposite to each other, and a frame portion. The method is characterized in that it comprises a step of adhering a portion to be adhered between the face plate and the rear plate while guiding by a jig, the jig functions as a guide such that the relative positions between the face plate and the rear plate are in a predetermined state at least in a direction within a plane of the plates, and the movement in the interval direction of the face plate and the rear plate can be allowed.

In this method, since the guide in a direction within a plane of the plates is provided by the jig, a flat panel display can be produced with high precision although there is a movement in the interval direction between the face plate and the rear plate.

Furthermore, since the face plate and the rear plate can be aligned by the jig setting the positions, the face plate and the rear plate can be aligned although there is a movement in the interval direction between the face plate and the rear plate.

A flat panel display according to the present invention includes a substantially flat face plate portion and a substantially flat rear plate portion.

The frame portion between the face plate portion and the rear plate portion can be adhered to the face plate and the rear plate in the step of adhering the frame member to the separately provided face plate and rear plate, or one of the face plate and the rear plate can be adhered to the frame member in advance before the adhering step, and the other is adhered to the frame member in the adhering step. Otherwise, when one of the face plate and the rear plate is produced, the frame portion may be simultaneously produced.

Another aspect of the present invention relating to a method for producing a flat panel display can be configured as follows.

That is, the method for producing a flat panel display include a face plate portion and a rear plate portion opposite to each other, and a frame portion. The method has a step of aligning the relative positions between the face plate and the rear plate; a step of positioning a jig for determining relative positions in a direction within a plane of the plates between the face plate and the rear plate by fitting to the face plate and the rear plate in the aligned state; and a step of adhering a portion to be adhered between the face plate and the rear plate while setting the inside relative positions between the face plate and the rear plate using the jig.

According to each of the above mentioned

inventions, it is preferable that the adhering step preferably contains a step of applying pressure to the portion to be adhered.

In addition, it is preferable that the adhering
5 step includes a heating step. In the heating step, an
adhesive of the portion to be adhered is rendered
adhesive. Then, by pressing the portion to be adhered,
by simply touching the portion to be adhered, or by
pressing after touching the portion to be adhered, the
10 portion to be adhered can be adhered. An adhesive may
be, for example, a flit glass.

In each of the above mentioned inventions, it is
preferable that the jig includes a sliding portion.
The relative positions of a face plate and a rear plate
15 can be set such that either the face plate or the rear
plate can touch a sliding member, but it is more
preferable that a plate side jig is provided for a face
plate or a rear plate, or for both face plate and rear
plate such that the plate side jig (corresponding to a
20 face plate fixing plate in the embodiments described
below) can touch another portion of a jig (a
positioning jig to which a sliding pole corresponds in
the embodiments described below).

That is, in each of the above mentioned
25 inventions, either the face plate or the rear plate, or
the plate side jig attached to either of them can be
moved as touching the positioning jig while a movement

in the interval direction is made while suppressing the misalignment between the face plate and the rear plate in a direction within a plane of the plates.

Furthermore, in each of the above mentioned invention, it is preferable that the jig, the face plate, and the rear plate have substantially equal expansion coefficients at a heating temperature when the adhering step is performed.

In addition, in each of the above mentioned inventions, it is preferable that the flat panel display includes an electron emitting portion and a fluorescent member which becomes fluorescent by an electron emitted by the electron emitting portion. Particularly, it is preferable that the electron emitting portion is provided in the rear plate portion, and the fluorescent member is provided in the face plate portion.

In each of the above mentioned inventions, a support member for maintaining an interval between the face plate portion and the rear plate portion can be provided between the face plate portion and the rear plate portion. The support member can be preferably a member covered with a conductive film.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a step of the method for producing a flat panel display according to the present

invention;

Figure 2 shows a step of the method for producing a flat panel display according to the present invention;

5 Figure 3 shows a step of the method for producing a flat panel display according to the present invention;

10 Figure 4 shows a step of the method for producing a flat panel display according to the present invention;

Figure 5 shows a step of the method for producing a flat panel display according to the present invention;

15 Figure 6 shows a step of the method for producing a flat panel display according to the present invention;

Figure 7 shows a step of the method for producing a flat panel display according to the present invention;

20 Figure 8 shows a step of the method for producing a flat panel display according to the present invention;

25 Figure 9 shows a step of the method for producing a flat panel display according to the present invention;

Figure 10 shows a step of the method for producing a flat panel display according to the present

invention;

Figure 11 shows a step of the method for producing a flat panel display according to the present invention;

5 Figure 12 shows a step of the method for producing a flat panel display according to the present invention;

Figure 13 is an explanatory view of a conventional technology;

10 Figure 14 is an explanatory view of a conventional technology;

Figure 15 is an explanatory view of a conventional technology;

15 Figure 16 is an explanatory view of a conventional technology;

Figure 17 is an explanatory view of a conventional technology;

Figure 18 is an explanatory view of a conventional technology;

20 Figure 19 is an explanatory view of a conventional technology;

Figure 20 is an explanatory view of a conventional technology;

25 Figure 21 is an explanatory view of a conventional technology; and

Figure 22 is an explanatory view of a conventional technology;

BEST MODE FOR CARRYING OUT THE INVENTION

First, in the producing method shown in Figures 13 through 22, it can be assumed that a flit glass to be heated at 400°C to 450°C is used when a face plate and a rear plate are adhered and fixed to guarantee the air-tightness to maintain the heat-resistance and vacuum required when a heat-aging process and a baking processes are performed in the subsequent steps.

It is also assumed that an atmospheric-pressure-resistant support member is provided in the flat panel display to stand the atmospheric pressure. The flit glass of the frame portion is formed thicker before the heating process than after the heating process as shown in Figure 16 to guarantee the strength and the air-tightness so that the adhered layer can be formed by thinning it by the heating and pressing operations. The thickness depends on the structure and the size of the member, but is about 0.5 to 2 mm. Since the flit glass has a subtraction allowance, the face plate and the rear plate are aligned at the room temperature, and the discrepancy in position in the XY direction arises when the flit glass becomes lower in the method in which the heating process is performed after the fixing using a clip, etc., thereby making it difficult to obtain a flat panel display with high position precision.

Plate heaters above and below the face plate and

the rear plate evenly heat them when they are aligned. Then, the flit glass is softened and then pressed, the aligning process is performed, the temperature is evenly lowered, and the aligning process is continued
5 until the flit glass is hardened. Thus, the process of obtaining a flat panel display with high position precision requires a complicated and costly system, and a long processing time.

Furthermore, as disclosed by Japanese Patent
10 Application Laid-Open No. 9-50767, a fine groove is made on the display portion of the substrate to perform an aligning process through insertion. However, the process of making a groove is complicated and costly, and cannot attain a sufficient fixing effect because
15 the depth of the groove is small.

The embodiment of the present invention described below has been developed to solve the above mentioned problem.

The preferred embodiment of the method for
20 producing the flat panel display according to the present invention is described below by referring to the attached drawings.

The embodiment is an example of producing an image generation device using a surface conductive electron
25 emission element.

Figures 1 through 12 sequentially show the producing process according to the present embodiment.

In Figure 1, an inorganic adhesive 2 containing silver powder is applied to an application stand 1, and an applicator 3 forms a thin layer 4 of a conductive adhesive.

5 The silver powder is an average of 3 to 5 micron grain, and the inorganic adhesive is a reactive silicates adhesive. According to the present embodiment, the heat-resistant inorganic adhesive 'Aron Ceramic W' (commercially available) of Toagosei Co.,
10 Ltd. in an average of 3 to 5 micron grain is used. The silver powder and the inorganic adhesive are mixed at the weight ratio of 20 : 80, and used as a conductive adhesive.

15 Then, an atmospheric-pressure-resistant support member 7, which is 0.2 mm thick and has a conductive layer on the surface, is set at predetermined intervals by a jig 5 having a chucking member 6 (Figure 2), and the thin layer 4 of the conductive adhesive touches one end of the atmospheric-pressure-resistant support
20 member 7 (Figure 3). By raising the jig 5, a conductive adhesive lump 8 is formed at the end of the atmospheric-pressure-resistant support member 7 (Figure 4).

25 Then, the atmospheric-pressure-resistant support member 7, at whose end the conductive adhesive pit 8 is formed by the jig 5, is set over a rear plate 9 fixed on a heating stand 11, and touches an upper wiring 10

of the driving XY matrix wiring on the rear plate 9
(Figures 5 and 6).

The conductive adhesive touches the upper wiring
10 of the driving XY matrix wiring on the heated rear
plate 9, is heated up to 200°C, and is hardened. At
this time, the indium metal powder in the conductive
adhesive is fused, and the atmospheric-pressure-
resistant support member 7 is fixed on the upper wiring
10 of the driving XY matrix wiring on the rear plate 9,
and electrically connected.

After hardening the conductive adhesive, the jig 5
is raised, and the rear plate 9 is removed from the
heating stand. Thus, a rear plate 12 is obtained by
fixing the atmospheric-pressure-resistant support
member 7 on the upper wiring 10 of the driving XY
matrix wiring (Figures 7 and 8).

Then, an insulating flit glass 20 for adhering the
frame is applied to the portion onto which the frame
touches on a face plate substrate 14 on which a black
stripe 16, which is a stopping member, an RGB
fluorescent object 17, and a voltage applying metal
back 18 are formed on a face place glass substrate 15.
The applied insulating flit glass 20 is dried, and
provisionally sintered.

The rear plate material 12 on which the
atmospheric-pressure-resistant support member 7 is
fixed at a predetermined position, a frame 19 on which

an insulating flit glass 13 is applied on the rear plate side, dried, and provisionally sintered, and the face plate substrate 14 to which the insulating flit glass 20 for adhering the frame is applied, dried, and provisionally sintered are set at predetermined positions (Figure 9).

The positions of the face plate 14 and the rear plate 9 are set in the X and Y directions by a face plate fixing jig 29 and a rear plate fixing jig 28. In this case, a face plate alignment mark 31 and a rear plate alignment mark 32 are aligned by monitoring through a CCD camera 30, and fixed by a fixing jig 24 movable in the thickness direction (Figure 10).

The fixing jig 24 movable in the thickness direction comprises a rear plate fixing plate 25, a face plate fixing plate 26, and a sliding pole 27. The sliding pole 27 is fixed to the rear plate fixing plate 25, and the face plate fixing plate 26 moves up and down along the hole into which the sliding pole 27 fits. These fixing jigs are made of ceramics ('Photoveel' preferably) which can be cut and has substantially the same expansion coefficient as the glass substrate used for the face plate 14 and the rear plate 9. The rear plate fixing plate 25 is adhered to the rear plate 9 with the inorganic adhesive, and is then aligned. Then, the face plate fixing plate 26 is adhered to the face plate 14.

The face plate 14 and the rear plate 9 fixed by the fixing jig 24 movable in the thickness direction are heated up to the temperature at which the flit glass is softened. The entire panel is pressed such
5 that the flit glasses 13 and 20 at portions of the frame 19 can be spread to obtain the strength and the air-tightness. After the spread, the glasses are cooled, and a flat panel display 21 is obtained (Figures 11 and 12).

10 According to the present invention, the position discrepancy does not occur in the XY direction unlike the conventional technology when the flit glasses are lowered, thereby successfully producing an image forming apparatus with high position and size precision
15 in a short-time process and a simple method.

As described above, according to an embodiment of the present invention, a face plate and a rear plate are aligned, they are fixed with a fixing jig movable in the thickness direction of a flat panel display, the
20 rear plate, the face plate, and the frame member are heated up to the adhering temperature, and a load is applied in the thickness direction of the flat panel display to cause adhesion, thereby easily producing the apparatus with high precision.

25 In addition, in a method in which an assembling process is performed by providing aligning means, such as penetration hole, on the face plate or the rear

plate after providing a fluorescent member, an acceleration electrode, an electron emission element, wiring, etc. on the face plate and the rear plate, it is necessary to mechanically form a hole, etc. in a glass substrate. The machining precision for a glass substrate within an error of ± 50 micron is quite difficult. In the above mentioned embodiments, after a face plate and a rear plate are aligned, they are fixed with a fixing jig movable in the thickness direction of a flat panel display, the rear plate, the face plate, and the frame member are heated up to the adhering temperature, and a load is applied in the thickness direction of the flat panel display to cause adhesion. The plate side jig and the sliding pole can slide without providing a sliding portion for the face plate or the rear plate. Therefore, the position precision in assembling can be obtained with an error of ± 10 micron.

Furthermore, by using the jig described by referring to the above mentioned embodiments, the alignment can be preferably performed between a face plate and a rear plate. As a result, once the face plate, the rear plate, and the jig are positioned at predetermined relative positions, the face plate and the rear plate can be separate, a vacuum chamber is exhausted, and then an adhering step is performed, thereby easily setting the atmosphere in the flat panel

display in a preferable state. Even after separating the face plate from the rear plate, the aligned status can easily be realized for successful adhesion.

As described above by referring to a practical
5 embodiment, the present invention can provide a
preferred method for producing a flat panel display.

INDUSTRIAL APPLICABILITY

The present invention can be effectively utilized
10 in the field of a flat panel display, and can easily
produce flat panel displays with high precision.

CLAIMS

1. A method for producing a flat panel display,
comprising a face plate portion and a rear plate
5 portion opposite each other, and a frame portion,
characterized in that the method comprises:

a step of adhering a portion to be adhered between
the face plate and the rear plate while guiding by a
jig, and said jig functions as a guide such that
10 relative positions between said face plate and said
rear plate are in a predetermined state at least in a
direction within a plane of the plates, and a movement
in an interval direction of said face plate and said
rear plate can be allowed.

15

2. A method for producing a flat panel display
comprising a face plate portion and a rear plate
portion opposite to each other, and a frame portion,
characterized in that the method comprises:

20 an alignment step of aligning relative positions
between the face plate and the rear plate;

a step of positioning a jig for determining
relative positions in a direction within a plane of the
plates between said face plate and said rear plate by
25 fitting to said face plate and said rear plate in the
aligned state; and

a step of adhering a portion to be adhered between

said face plate and said rear plate while setting the relative positions between said face plate and said rear plate in a direction within a plane of the plates using said jig.

5

3. The method according to claim 1 or 2, characterized in that said adhering step comprises a step of applying pressure to said portion to be adhered.

10

4. The method according to claim 1 or 2, characterized in that said adhering step comprises a heating step.

15

5. The method according to claim 1 or 2, characterized in that said jig comprises a sliding portion.

20

6. The method according to claim 1 or 2, characterized in that said jig comprises a plate side jig fixed to said face plate or said rear plate, and a portion touching the plate side jig and setting relative positions between said face plate and said rear plate.

25

7. The method according to claim 1 or 2, characterized in that said jig, said face plate, and

said rear plate have substantially equal expansion coefficients at a heating temperature when said adhering step is performed.

5 8. The method according to claim 1 or 2,
characterized in that said flat panel display comprises
an electron emitting portion and a fluorescent member
which becomes fluorescent by an electron emitted by the
electron emitting portion.

10 9. The method according to claim 8, characterized in
that said electron emitting portion is provided in said
rear plate portion.

15 10. The method according to claim 8, characterized in
that said fluorescent member is provided in said face
plate portion.

20 11. The method according to claim 8, characterized in
that a support member is provided between said face
plate portion and said rear plate portion, for
maintaining an interval between said face plate portion
and said rear plate portion.

ABSTRACT

5 A method for producing a flat panel display
including a face plate portion and a rear plate portion
opposite to each other, and a frame portion. The
method is characterized in that it comprises a step of
adhering a portion to be adhered between the face plate
and the rear plate while guiding by a jig. The jig
functions as a guide such that the relative positions
10 between the face plate and the rear plate are in a
predetermined state at least in a direction within a
plane of the plates, and the movement in the interval
direction of the face plate and the rear plate can be
allowed.

FIG. 1

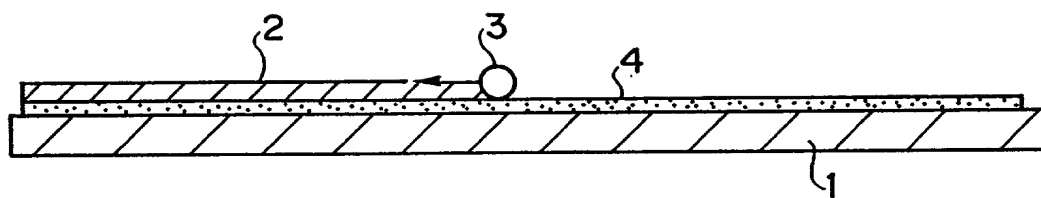


FIG. 2

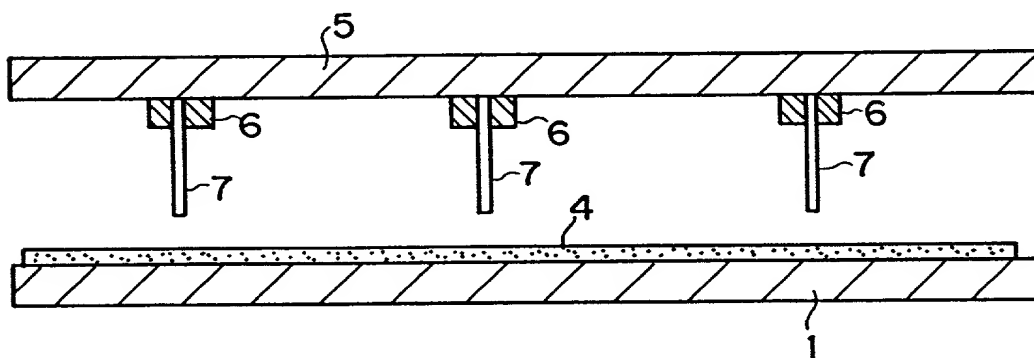


FIG. 3

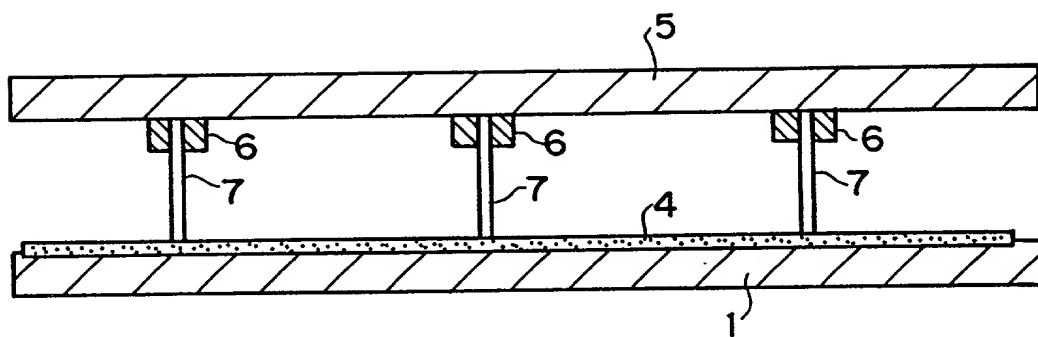


FIG. 4

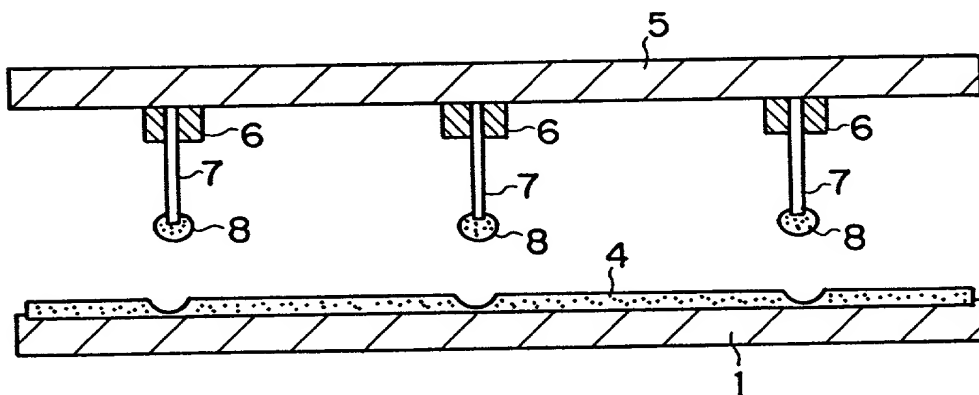


FIG. 5

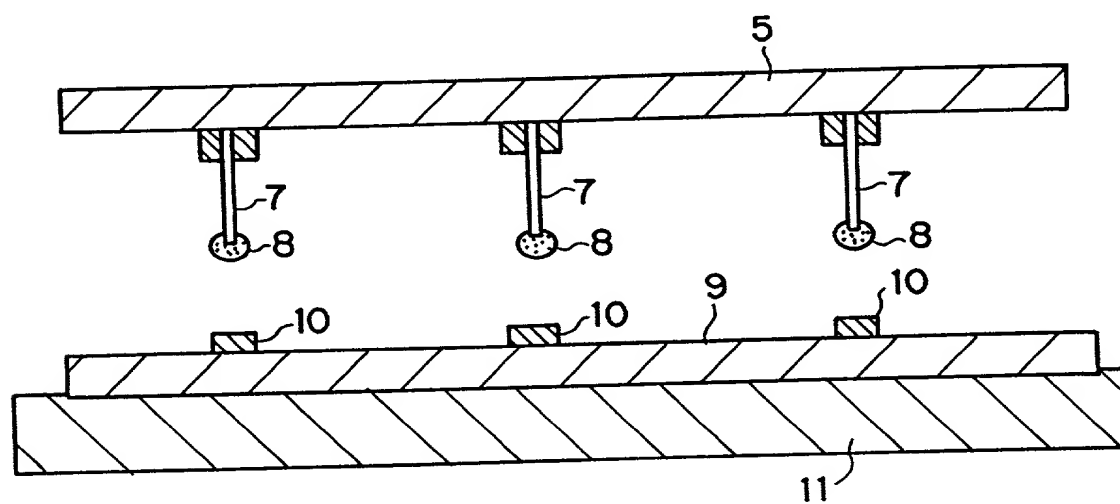


FIG. 6

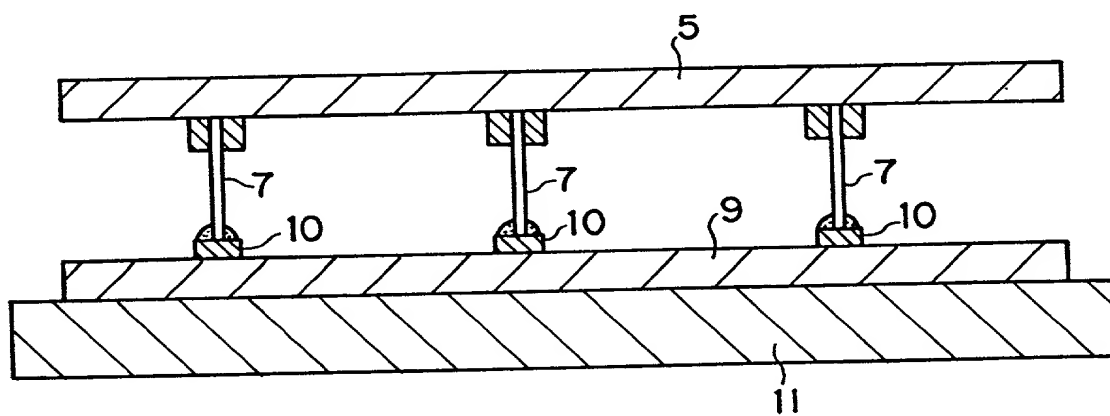


FIG. 7

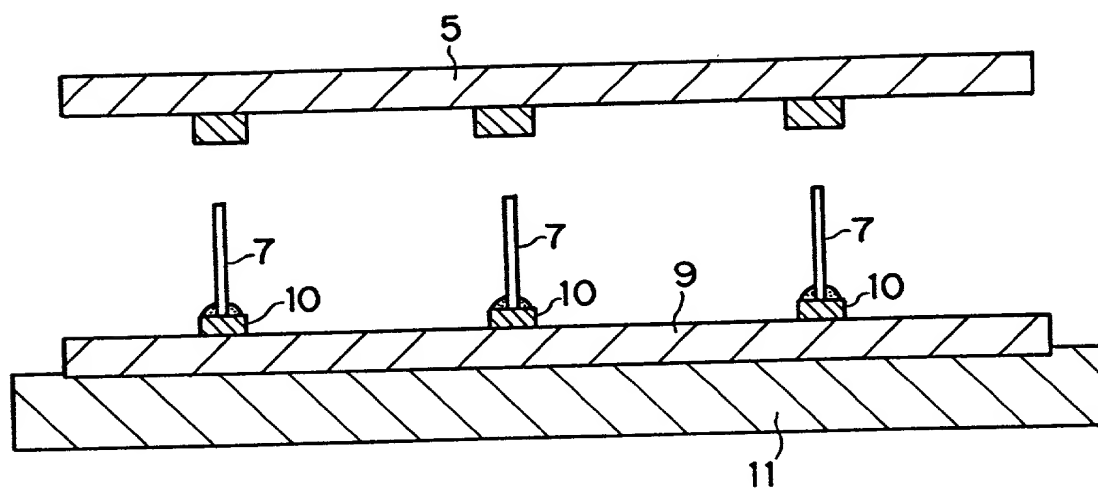


FIG. 8

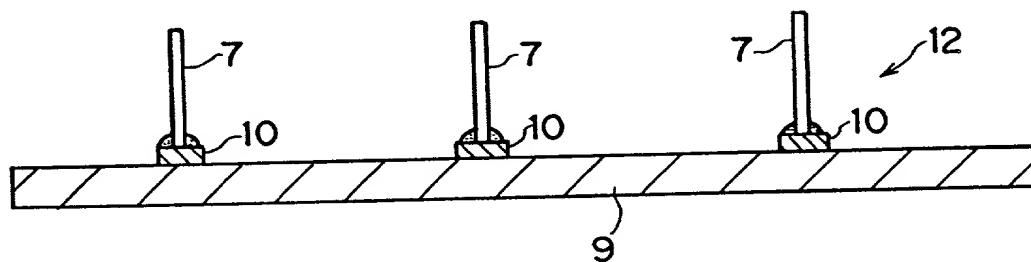


FIG. 9

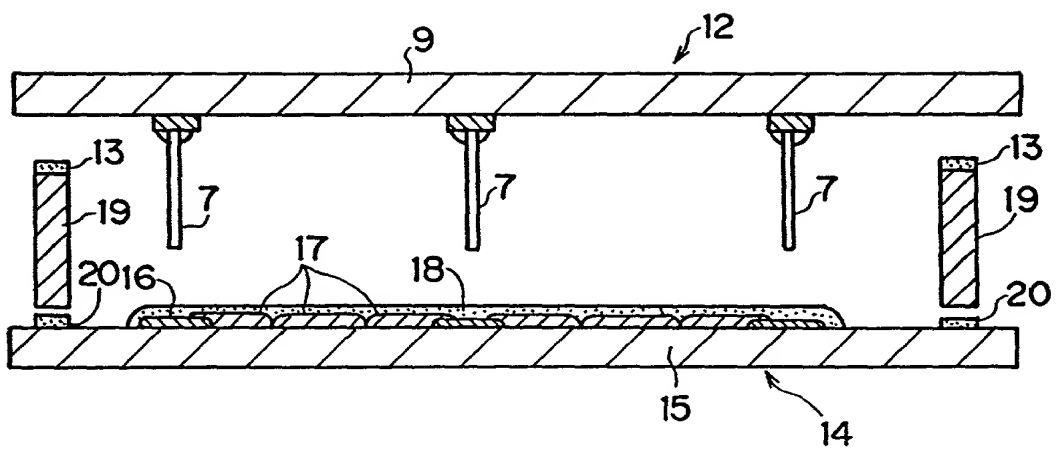


FIG. 10

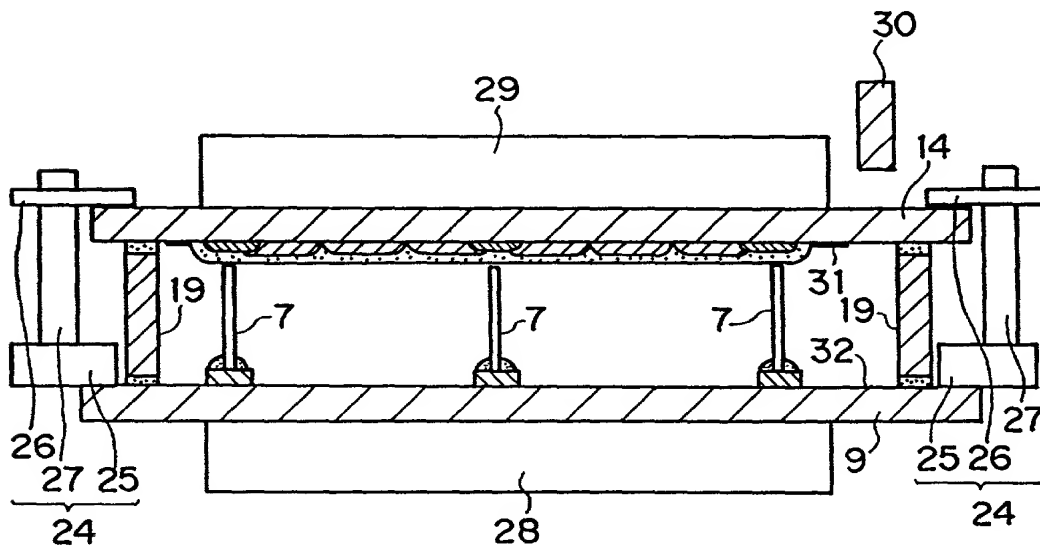


FIG. 11

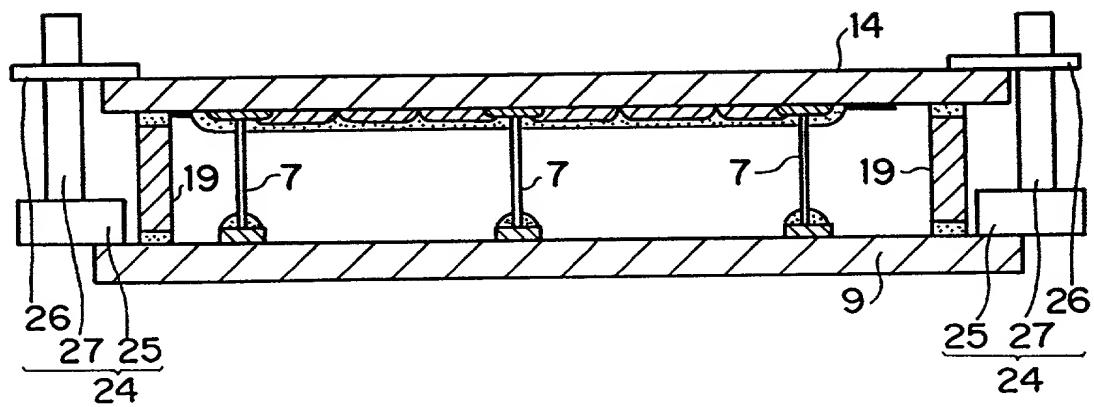


FIG. 12

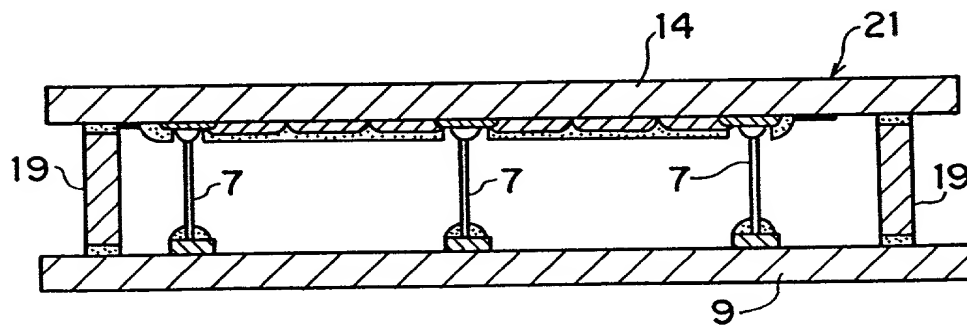


FIG. 13

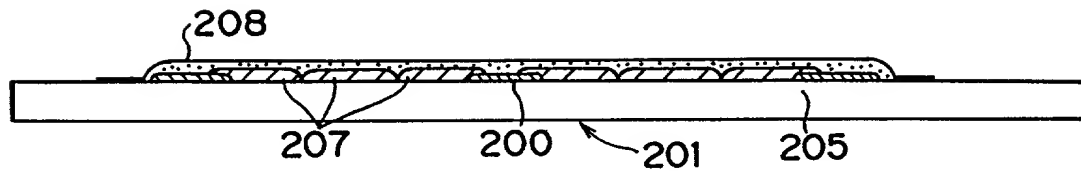


FIG. 14

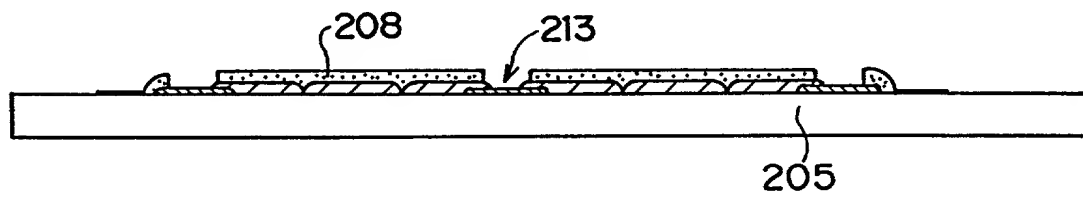


FIG. 15

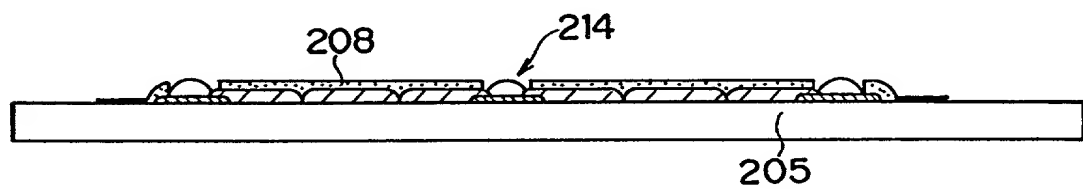


FIG. 16

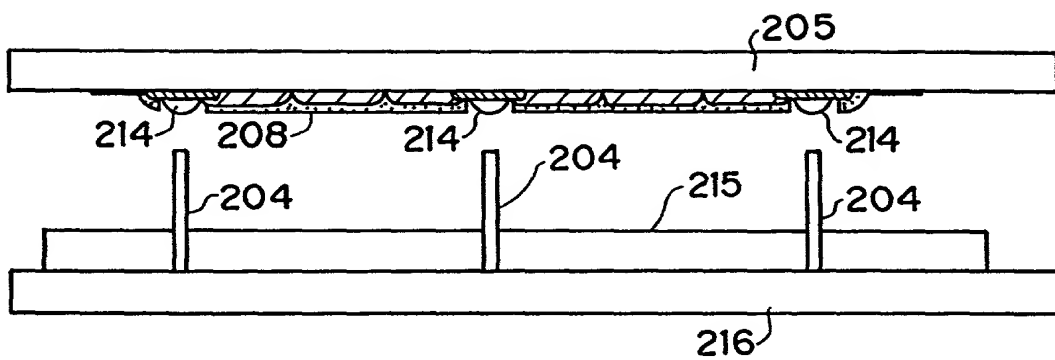


FIG. 17

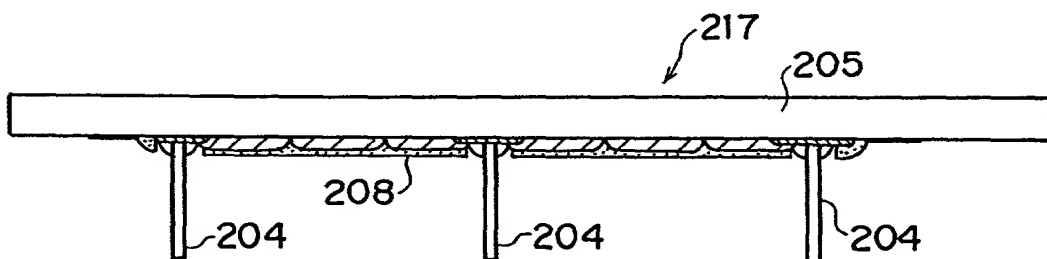


FIG. 18

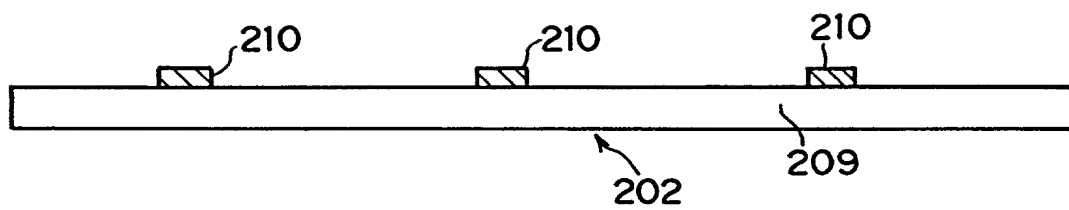


FIG. 19

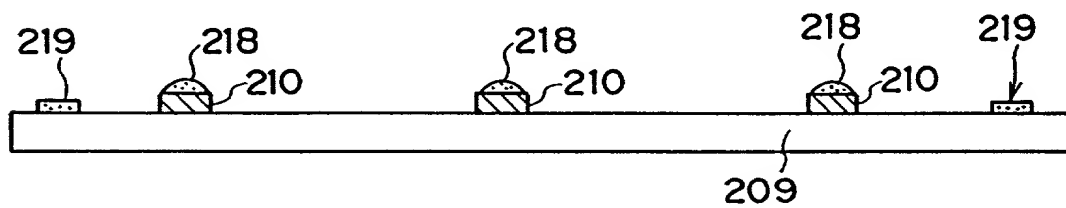


FIG. 20

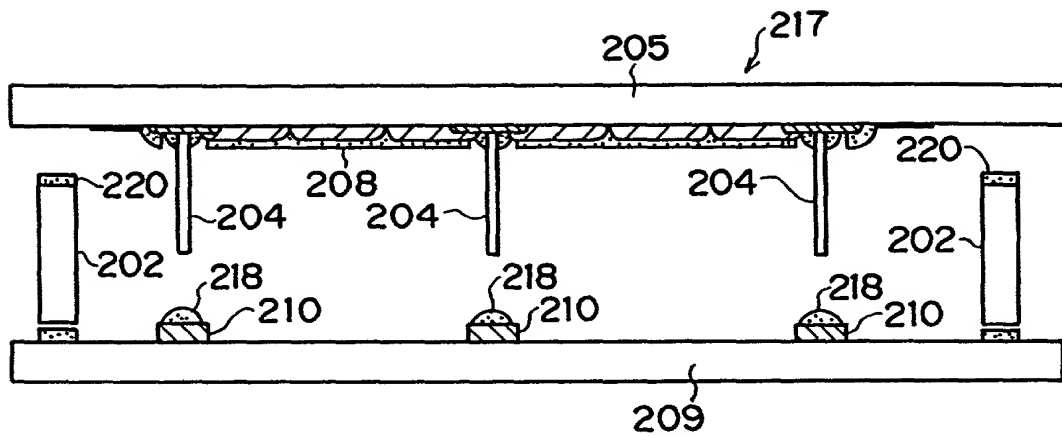


FIG. 21

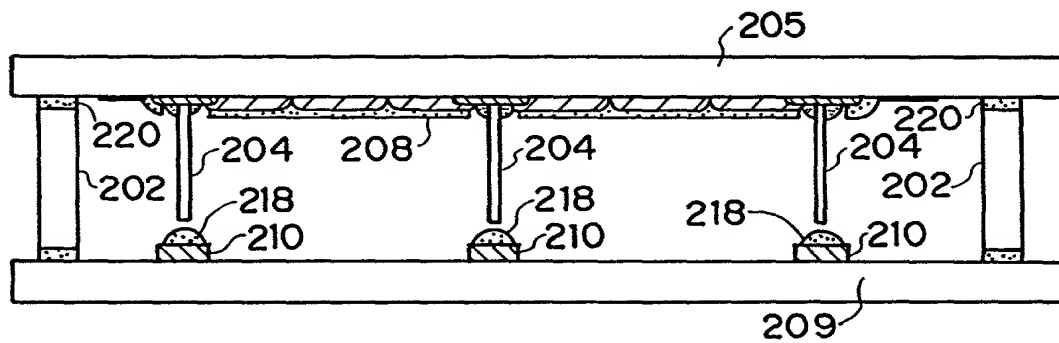
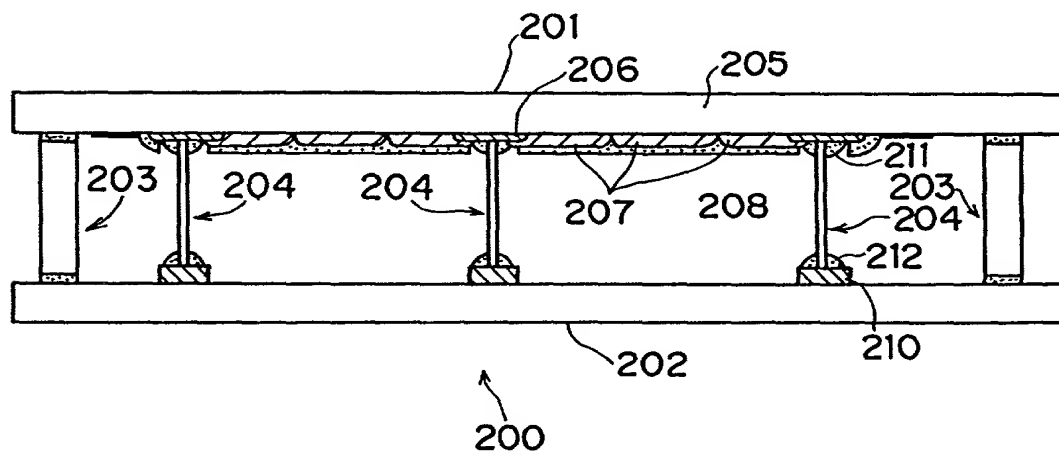


FIG. 22



COMBINED DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

(Page 1)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled METHOD OF PRODUCING FLAT PANEL DISPLAYS

the specification of which ☐ is attached hereto ☒ was filed on March 9, 2000 as United States Application No. or PCT International Application No. PCT/JP00/01436 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or §365(b), of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designates at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT international application having a filing date before that of the application on which priority is claimed:

<u>Country</u>	<u>Application No.</u>	<u>Filed (Day/Mo./Yr.)</u>	<u>(Yes/No)</u> <u>Priority Claimed</u>
JAPAN	11-063859	10 March 1999	Yes

I hereby appoint the practitioners associated with the firm and Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to the address associated with that Customer Number:

FITZPATRICK, CELLA, HARPER & SCINTO
Customer Number: 05514

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Full Name of Second Joint Inventor, if any _____
Second Inventor's signature _____
Date _____ Citizen/Subject of _____
Residence _____
Post Office Address _____